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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/542,999

07/20/2005

Chaonan Xu

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10/02/2007

DARBY & DARBY P.C.

P.O. BOX 770

Church Street Station

New York, NY 10008-0770

EXAMINER

HEVEY, JOHN A

ART UNIT

PAPER NUMBER

1709

MAIL DATE

DELIVERY MODE

10/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/542,999

Applicant(s)

XU ET AL.

Examiner

John A. Hevey

Art Unit

1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7-20-05 and 9-23-05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Status of Application

1. Claims 1-10 are pending and presented for examination.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. JP03/17095, filed on 12/26/2003.

Information Disclosure Statement(IDS)

3. The information disclosure statements (IDS) were submitted on 07/20/2005 and 09/23/2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicants' copy of the 1449 submitted herewith.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting

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directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-2, 4, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Rao et al. (US 6423248).

The instant claims are drawn to a method for producing a high brightness luminescent material, including a matrix material containing aluminate, and a luminescent center containing a rare earth or transition metal ion, comprising steps

- i. Making an acidic solution of a water based solvent containing aluminum alcoholate as source of aluminum, and a metal compound of a rare earth or transitional metal
- ii. Conducting 'preliminary' calcination of said acidic solution between 900-1100 C under oxidizing conditions
- iii. Conducting 'main' calcination at a temperature higher than 'preliminary' calcinations, under reducing conditions, and a step for pulverizing the product of calcination

In regards to claim 1, Rao et al. teaches a method of producing a manganese activated alkaline earth aluminate phosphor (see claim 1), where said method comprising steps of reacting an aqueous solvent comprising a source of manganese, a source of alkaline earth selected from Ba, Sr, Ca, and Mg, and an organic precursor providing a source of aluminum (equivalent to

aluminum alcoholate) to form a gel in an acidic medium. Rao further teaches decomposing the gel at 1000 C in an oxidizing atmosphere (equivalent to preliminary firing), and again at 1200 C in a reducing atmosphere (equivalent to main calcinations)(see claim 6). And finally, Rao teaches providing a step for powder pulverization before or after decomposition step (see claim 8).

In regards to claim 2, because the contents of the solution taught by Rao are the same as the required claims, it follows that the solution would inherently possess the same pH as recited in claim 2.

In regards to claim 4, Rao teaches the use of nitrate compounds including barium nitrate, strontium nitrate, calcium nitrate, and magnesium nitrate (see examples I-IV).

In regards to claim 9, the instant claim defines a product by how the product was made. Thus, claim 9 is product-by-process claim. For purposes of examination, product-by-process claims are not limited to the manipulation of the recited steps, only the structure implied by the steps. See MPEP 2113. In the present case, the recited steps imply a luminescent powder. The reference suggests such a product (see above).

6. Claims 1, 5-7, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Ravilisetty (US 6660186).

In regards to claim 1, Ravilisetty teaches a method for producing a europium activated alkaline earth aluminate phosphor having the formula: $(\text{AE}_{2-x-y}\text{La}_x\text{Eu}_y)\text{Al}_{10}\text{O}_{17}$ where x is between 0 and 1, y is between .01 and .1, La is

lanthanum, and AE is alkaline earth. Said method comprising steps of forming aqueous acidic solution including an organic precursor providing a source of aluminum, a source of alkaline earth, a source of europium, and optionally a source of lanthanum to form a gel, converting gel into a gel powder, and decomposing said powder in an oxidizing atmosphere at 900-1200 C and in a reducing atmosphere at 1000-1200 C (see claim 1).

In regards to claim 6, the prior art teaches specific examples teach the use of a BAM type material (column 5, lines 21-52).

In regards to claim 7, the prior art teaches the addition of a flux agent to water-based solvent solution (column 6, lines 31-37).

In regards to claim 10, the instant claim defines a product by how the product was made. Thus, claim 10 is product-by-process claim. For purposes of examination, product-by-process claims are not limited to the manipulation of the recited steps, only the structure implied by the steps. See MPEP 2113. In the present case, the recited steps imply a luminescent material, further requiring said material be excited by vacuum ultraviolet radiation. Ravilisetty teaches a blue emitting phosphor (equivalent to high brightness luminescent material) excited by vacuum ultraviolet radiation (see abstract).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rao et al. (US 6423248) as applied above in view of Zachau et al (US 6045721).

Rao teaches a 'main' decomposition step "below solid state reaction temperature (column 7, lines 4-5)" and more preferably "equal to about 1200 C (column 7, line 25)" but fails to teach main decomposition between 1400-1600 C. However, it would have been obvious to one of ordinary skill in the art to modify

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the decomposition temperature to 1400-1600 as taught by Zachau et al., who teaches a BAM phosphor annealed between 1400-1700 C, preferably between 1550-1610 C. The motivation to make such an adjustment would be to improve phosphor brightness.

10. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Ravilisetty (US 6660186) as applied above, in view of Miller (US 2286298).

Ravilisetty teaches the use of a flux agent but does not teach the use of NH_4BF_4 specifically as said flux agent. However, it would have been obvious to one of ordinary skill in the art to use NH_4BF_4 , because it is a well known flux agent as taught by Miller. Miller teaches the use of ammonium fluoroborate as a flux agent in aluminum materials. The motivation for such a substitution would be improved stabilization of the reaction during decomposition.

Conclusion

11. All claims have been rejected.
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. Hevey whose telephone number is 571-270-3594. The examiner can normally be reached on Monday - Friday 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-270-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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A handwritten signature in black ink, appearing to be 'V. Kim', with a large, stylized flourish extending from the bottom left.

VICKIE Y. KIM
SUPERVISORY PATENT EXAMINER